Price and Income Elasticities in LAC Countries: The Importance of Domestic Production

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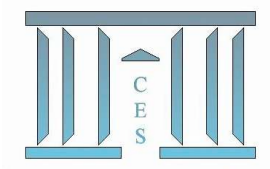

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Abstract

The inclusion of time in the household domestic production function allows to calculate full prices that are in turn used to estimate consistent monetary and time elasticities on micro cross-sectional data. This article provides elasticity estimates for different commodity groups in absence of observable price data, solving the persistent problem of price data availability in most developing countries. The estimated price elasticities perform well compared to other methods and can be computed for different sub-populations, which is important for policy design and the calibration of simulation models.

Keywords: Demand elasticities, domestic production, time-use.

1 Introduction

The study of consumers behavior has been for long time one of the most important concerns in economic theory. It provides an important insight on how economic agents react to shocks in prices and income.

Since its Marshallian beginning, the consumer demand model has evolved to more complex systems like the Rotterdam model, the Almost Ideal Demand System, and many

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others. Becker has transformed consumers into producers and metamorphosed the household from a simple agent to a small factory producing its own final goods thanks to monetary commodities and time as inputs. However, implementing the estimation of demand system in developing countries has become a challenge since there are almost no reliable sources of local price data and even when such a data exist, it is very likely to be incomplete for all commodities other than food.

Welfare policies are concerned about targeting different sub-groups of the population. For instance, the population on the lowest decile of the income distribution will certainly not react in the same way to changes in commodity prices as those in the highest deciles. In order to correctly evaluate the effects of these policies one needs pertinent demand elasticity estimates for the targeted population. Unfortunately, most available demand elasticities are estimated from macro time-series, in particular due to the lack of prices data at micro level. Time-series data is in general considered as being not robust to the specification of the demand system, its stationarity conditions are frequently rejected for long-term series and they give no information on the change of price and income effects according to the household characteristics.

Since most macroeconomic and microeconomic simulation models, including computable general equilibrium models, use elasticity estimates for the calibration procedure, it is necessary to provide consistent estimations of these parameters as it is done in this article.

The introduction of time in the households production function Becker (1965) allows us first, to take into account the domestic production in the estimation of the demand system and secondly, it makes this estimation possible for different categories of aggregated goods. In this paper, we examine various methods to compute price elasticities from micro data and use a new one that overcomes the problem of price data availability and includes the households domestic production in the estimates.

The objectives of this paper are twofold: first, to provide robust elasticity estimates using micro data for different commodity groups, and second, to investigate the possible differences in price and income elasticities once domestic production has been incorporated into the analysis.

The organization of the paper is as follows: Section 2 reviews the different methods to estimate price elasticities. Section 3 describes the data and Section 4 discusses the results and concludes.

2 Methodology

Methods to estimate price elasticities

Price elasticities can be estimated: first, by the estimation of demand systems under Slutsky constraints, which is generally applied to macro time-series (because price variability is uncommon in micro datasets). Second, by arc-elasticity computed between two periods characterized by large changes in prices, see Gardes and Merrigan (2011). Third, by a method initiated in remarks by Hicks and Stone and fully discussed by Lewbel, based on a computation of price indexes weighting individual prices by current budget shares. Finally, Deaton (1988) proposed a method to compute price elasticities on cross-sectional micro-data using unit values, for surveys containing information on the quantities consumed and the value of expenditures. In this paper, we use a method which consists of computing *full prices* for individual agents, defined as the sum of the monetary price and a shadow price corresponding to non-monetary resources such as time.

Definition of full prices

As explained in Gardes (2014) full prices are defined as the ratio of full expenditure over the monetary expenditure:

$$\pi_{ih} = \frac{(p_i + w_h t_{ih}) x_{ih}}{p_i x_{ih}} = 1 + \frac{w_h t_{ih}}{p_i},$$

with p_i the monetary price for commodity i, w_h the time valuation by the average opportunity cost of household h, and t_{ih} the household's time participation to activity i. Note that the definition of full prices relies only on expenditure data, so elasticity estimates can be recovered for every good and service for which monetary and time expenditures exist.

Under the assumption of a common monetary price p_i for all households, this ratio contains all the information of the differences of full prices through w_h and t_{ih} (for instance its logarithm in the AI specification is approximatively equal to $w_h t_{ih}/p_i$ for small values of this product). Moreover, it does not longer depend on the quantity consumed x_{ih}. Possible endogeneity in the full demand equations between full expenditure $(p_i + w_h t_{ih}) x_{ih}$ and the vector of full prices π_{ih} is corrected by defining prices by the alternative time valuation, for instance, minimum wage when full expenditures are computed with the market wage.

Demand system specification

We use an Almost Ideal specification, which is the most commonly used model to estimate demand elasticities. One of the model's main advantages is that even is the model if nonlinear, one can use the Stone price index to approximate the AIDS to its linearized version LAIDS. In turn, a main problem arises from this approximation. As pointed out by Pashardes (1993), the errors coming from the approximation can result in biased parameter estimates, which can be seen as an omitted variable problem. The bias is bigger when the AI model is applied to micro-data, because in this case expenditures are highly correlated with the demographic characteristics of the household and thus are very heterogeneous between households. In order to correct this bias Pashardes proposes a simple reparameterization of the price parameter that circumvents the problem created by the Stone price index.

Demands are specified as an Almost Ideal demand system:

$$\omega_i = \alpha_i + \beta_i \, log\left(\frac{y}{m}\right) + \sum_{j=1}^{n} \gamma_{ij} \, log\pi_j + \lambda_i \, Z + \varepsilon_i, \tag{1}$$

where $i = 1, ..., n$ denotes the different commodity groups, ω_i the respective budget shares, y the household expenditure, π the full price of commodity i, Z socio-economic characteristics of the household, and m the Stone's price index after the correction proposed by Pashardes (1993).

Note that the demand system is estimated for monetary, time, and full expenditures separately. In order to avoid the nonlinearity of the income variable in the latter specification, we use the income coefficient derived from the income and time elasticity equations. All the estimates are performed under homogeneity, additivity, and symmetry constraints.

Derivation of demand elasticities

In order to proceed with the estimation two main problems have to be overcome: first, quality effects are likely to exist in full prices and expenditures data since more time to consume the same quantity may induce a higher quality of the domestic production. Various methods have been proposed to correct this endogenous quality, in this paper we use the quality correction technique proposed by Cox and Wohlgenant (1986). Roughly speaking, the method consists of a regression of full prices on selected sociodemographic characteristics such as region, household size, and household income. Quality adjusted prices for each commodity group are generated by adding the value of the constant to the

residuals of the regression. Second, generated regressors induce a bias on the variances that needs to be corrected. Since time and quality corrected prices are generated regressors, variances are corrected by a standard bootstrap procedure.

Hicks own and cross-price elasticities

When prices or unit values are available, price elasticities can be directly calculated from the price coefficients of the demand system. So the full price elasticity writes:

$$E_{x_i/\pi_j} = \frac{\hat{\gamma}_{ij}}{\bar{\omega}_i} + \bar{\omega}_j - \delta_{ij} \tag{2}$$

The monetary price and time elasticities are easily derived (see De Vany (1974)):

$$E_{x_i/p_j} = E_{x_i/\pi_j} \frac{p_j x_j}{\pi_i x_j} \tag{3}$$

$$E_{x_i/t_j} = E_{x_i/\pi_j} \frac{w\ t_j x_j}{\pi_i x_j} \tag{4}$$

Note that the full price elasticity is the sum of the monetary price and time elasticities. Hence, the estimates represent the contribution of money and time in the full price elasticity.

Valuation of time

The model is estimated using the minimum wage as the opportunity cost of time, which implies a uniform cost of domestic production for the whole population, see Canelas et al. (2013) and Gardes (2014) for different valuations of time and further explanation.

3 Datasets

The primary sources of data for this study are the National Survey of Employment and Unemployment (ENEMDU-Encuesta Nacional de Empleo y Desempleo) from 2007 and the Family Expenditure Survey from 2006 for Ecuador. The Guatemalan dataset comes from The National Survey about Life Conditions (ENCOVI-Encuesta de Condiciones de Vida) from the year 2000.

The sampling unit is a dwelling or housing structure and information regarding the household or households occupying each dwelling is collected. We consider the household as the unit of analysis and we work with a reduced sample of nuclear families that have either no-children or children aged less than 16 years old. We regroup time activities that are compatible with the monetary expenditure on nine categories for Ecuador and eight categories for Guatemala: Personal Care, Health Care, Food, House Maintenance, Clothing, Education, Transportation, Leisure, and Others.

Our key variables are defined as follows: the annual total expenditure and income of the household are divided by the square root of the number of persons in the household in order to take into account possible economies of scale. The total expenditures per category are annualized by multiplying the expenditure of each item by the frequency of consumption reported. The demographic variables include education and age of the household head, the logarithm of the household size to account for possible non linearities in demand, and dummy variables for families with kids and those living in couple.

Since not all households purchased all commodities during the survey period, prices were not observed for non-consuming households. Whenever this was the case the mean price was used instead. Finally, in order to avoid possible endogeneity between total expenditure and the budget shares in the demand model, we instrumented household total expenditure by household total revenue.

Ecuador

Given data unavailability, we could not obtain monetary and time expenditures of the unit of analysis from the same source of information, so we proceeded with a matching of two different surveys by a Tobit regression on similar characteristics in both datasets. For each activity in the Time Use survey, we impute time estimates for all the observation in the Family Expenditure Budget Survey.

Summary statistics of household demographic characteristics are presented in Table A.1 in the Appendix. On average, urban households represent 59% of the sample, and the average age of the household head is 42 years all. The level of education is low, with 53% of the household heads having primary education or less.

Guatemala

The Guatemalan survey contains both the monetary expenditures made by the household and a record of its allocation of time over all types of activities. Any price distortions caused by the Guatemalan civil war that ended in 1996 are expected to have disappeared by the year 2000.

Summary statistics are also presented in the Appendix. On average, urban households represent 45% of the sample, the average age of the household head is 38 years all, and the level of education is extremely low, with 77% of the household heads attaining at most primary education.

Sample statistics

A quick look at Tables A.2 and A.4 in the Appendix shows the differences between the Ecuadorian and Guatemalan population. Partitioning the data by educational attainment allows not only to compare the parameter estimates between different income levels (lower levels of education are associated with lower levels of family income), but also gives us an interesting overview of living standards within each country.

Roughly speaking, the richest group of the population, those with tertiary education, has on average an annual equivalent income of 5,072 american dollars in Ecuador, and of 56,278 quetzales in Guatemala, while the average annual equivalent income for the poorest group (primary education) is 1,578 dollars and 9,640 quetzales, respectively. That is, a family with a household head that has attained tertiary education has, in average, an equivalent income 3.2 times greater than a family with primary education. The situation is more striking for Guatemala, where the difference in income between is 5.8 times greater. It is worth notice that 53% and 77% of the population in Ecuador and Guatemala, respectively, have attained at most primary education, if any. These statistics reinforce the robustness of the income elasticity estimates for education expenditures in Guatemala, which point out that education is a luxury good for the poorest households in the sample.

Important differences can also be observed in the region of residence of the poverty group (primary education). For the case of Ecuador we found that 59% of this group resides in the rural area of the country against an 11% of the richest group. Similar results were found for Guatemala, where 66% of the poor are concentrated in this area against 10% of the richest population.

4 Results

Note that the estimated elasticities are calculated on the basis of full prices, which contain time and monetary expenditures. For the interpretation of the results we assume that changes in prices refer to the monetary part of the price, while changes in income correspond to changes in others sources of income, but not wages, which otherwise will immediately change the cost of time. The interpretation for changes in wages should be done in the same way, that is, keeping the monetary part of the price constant.

Table 1 and 2 show the results of the monetary and full income elasticities. In the case of Ecuador, most goods have a unitary demand that is, an increase in income generates a proportional increase of demand for goods which is due (according to the additivity constraint) to the high value of the income elasticities for food. Finally, only food, health, and education are necessity goods, while for Guatemala just transport and leisure are luxury goods, implying a more inelastic demand for the rest of commodities. It is noteworthy that at the population level, for both countries, food is a necessity good, as expected from theory, and leisure is mostly a luxury good.

Table 1: Income Elasticities, Whole Sample

Commodity Groups	Income Elasticities			
	Ecuador		Guatemala	
	Monetary	**Full**	**Monetary**	**Full**
Food	0.894	0.965	0.794	0.846
Housing	1.044	1.019	0.683	0.777
Transport	1.049	1.107	1.213	0.958
Clothing	1.153	1.018	0.861	0.965
Personal Care	1.064	0.992	0.755	0.576
Health	0.982	0.994	0.900	0.952
Education	0.975	0.971	0.789	1.234
Leisure	1.570	1.007	1.205	1.266
Others	1.161	1.097	-	-

In general, the Ecuadorian full expenditure for goods is more time intensive than those of Guatemala. We observe that full income elasticities are smaller than monetary elasticities for time intensive goods. This is explained by the fact that the domestic production allows for an exchange between time and monetary resources. Indeed, if the family revenue decreases, the income lost can be compensated by an increase in the time spent in

domestic production and a decrease in monetary goods expenditure. Guatemala being a poorer country than Ecuador the substitution may be feasible only for the richest population (those in the group with tertiary education), since the monetary constraint is stronger for poorer households.

Table 2: Full Income Elasticities by Education Level

Commodity Groups	Education Level					
	Ecuador			Guatemala		
	Primary	**Secondary**	**Tertiary**	**Primary**	**Secondary**	**Tertiary**
Food	0.956	0.969	0.988	0.820	1.010	1.331
Housing	1.030	1.008	0.999	0.798	0.695	0.784
Transport	1.097	1.116	1.107	1.024	0.801	0.453
Clothing	1.030	1.007	1.009	0.972	0.928	1.099
Personal Care	0.992	0.983	1.006	0.589	0.483	0.230
Health	1.018	0.992	0.946	1.108	0.726	0.410
Education	0.973	0.972	0.989	1.337	1.072	0.614
Leisure	1.013	1.003	0.995	1.484	0.770	0.635
Others	1.086	1.132	1.028	-	-	-

The Guatemalan income elasticities by education level deserve particular attention. The estimates of the households that have attained at most primary education are considerably bigger than those from secondary and tertiary education. This can be explained by the structure of budget shares. As it can be seen on Table A.4 in the Appendix, the population having attained at most primary education is the poorest one, so it is not surprising that education and leisure have become a luxury good for them (both in the monetary as well as in the full dimension). What is striking is that as expenditure is aggregated at the household level, this commodity mostly comprises the expenses on children education, so when income decreases kids are directly affected, leading to a downward spiral for the poorest population.

Table 3 compares the compensated own price elasticities to those based on the hypothesis of want independence proposed by Frisch (1959). Indeed, in absence of price data, Frisch (see also **?**) has developed a method that allows to compute price elasticities derived from income elasticities under the assumption of strong separability among goods.

The price elasticity for good i can be written in terms of the income elasticity of this good and of the Frisch income flexibility index $\breve{\omega}^{-1}$:

$$E_{x_i/\pi_j} = \delta_{ij}\, \breve{\omega}^{-1}\omega_i E_{x_i/y} - \omega_j E_{x_i/y}(1 + \breve{\omega}^{-1}E_{x_j/y}), \tag{5}$$

where $\delta_{i,j}$ is the Kronecker index and the Frisch income flexibility index $\breve{\omega}$ equals the income elasticity of the marginal indirect utility. The latter one is calibrated at -0.5, as predicted by Frisch and estimated by Theil, see Selvanathan (1993).

Two important results come out from the estimations. First, all price elasticities are significantly different from zero and range from -1.5 to 0. The value and magnitude of the estimates is consistent with other elasticity estimates.

Secondly, the estimates of price elasticities under the separability assumption (Frisch elasticities) are much lower compared to the compensated price elasticities. The former one oscillates around 0.5, while the latter one around 1, this gap is even greater and clearer in the case of Ecuador. Therefore, we have a strong suspicion of non separability between the different commodity groups. If the Frisch price elasticities are estimated under the separability assumption and the compensated ones are not, one can run a Hausman test on separability between the two estimates, to see if separability holds in the dataset. Since the difference in the two estimates is smaller for Guatemala, we computed this test on the Guatemalan dataset and as expected, we conclude on the non-separability among commodity groups.

Table 3: Full Own-Price Elasticities, Whole Sample

Commodity Groups	Full Own-Price Elasticities			
	Ecuador		Guatemala	
	Frisch	**Compensated**	**Frisch**	**Compensated**
Food	-0.712	-0.767	-0.619	-0.739
Housing	-0.576	-1.116	-0.506	-0.813
Transport	-0.560	-1.088	-0.508	-1.198
Clothing	-0.598	-1.021	-0.513	-0.837
Personal Care	-0.544	-1.004	-0.310	-1.034
Health	-0.522	-1.343	-0.484	-1.462
Education	-0.504	-1.139	-0.660	-0.657
Leisure	-0.804	-0.798	-0.666	-0.714
Others	-0.613	-1.254	-	-

As for the compensated own-price elasticities, it is noteworthy that for Ecuador just food and leisure are inelastic, while in the case of Guatemala the demand for all goods but transport, personal care, and health is price inelastic. In both countries, food is the only commodity that is inelastic with respect to changes in income and price. Leisure is a superior good (as concern the monetary income effect), so its consumption increases with

income, but when prices change, the demand is inelastic. This can be explained by the fact that in Ecuador and Guatemala, in average, leisure is more time intensive compared to others goods. So, when income increases, its monetary expenditure increases as well; but when prices change, demand is little sensitive since time may still be consumed by the same amount. That is, time consumption of a good *i* does not necessarily imply a monetary expenditure. It all depends on the elasticity of substitution for each good between time and money. Therefore, one can imagine that the elasticity of substitution for leisure is big.

The cross price elasticities shown on Tables A.5 and A.6 in the Appendix, are pretty low and positive in general, indicating substitution between semi-aggregated activities. The small substitution across different groups of commodities is not unusual in the literature. This effect can be accentuated by the incorporation of domestic production as we are also taking into account the substitution between monetary expenditure and time.

Table 4: Compensated Own-Full Price Elasticities by Education Level

Commodity Groups	Education Level					
	Ecuador			Guatemala		
	Primary	**Secondary**	**Tertiary**	**Primary**	**Secondary**	**Tertiary**
Food	-0.795	-0.762	-0.702	-0.673	-0.849	-1.083
Housing	-1.111	-1.132	-1.268	-0.741	-0.833	-0.958
Transport	-1.093	-1.075	-1.111	-1.139	-1.196	-1.350
Clothing	-1.031	-1.000	-1.032	-0.779	-0.911	-0.951
Personal Care	-1.005	-1.010	-0.994	-0.952	-1.119	-1.496
Health	-1.419	-1.268	-1.187	-1.425	-1.541	-1.115
Education	-1.060	-1.167	-1.329	-0.621	-0.715	-0.817
Leisure	-0.797	-0.799	-0.799	-0.652	-0.800	-0.977
Others	-1.254	-1.300	-1.438	-	-	-

When we look at the full price elasticities by education level (Table 4), we observe that the more educated people (i.e the wealthiest ones) are more sensitive to price variation than their counterparts. This is maybe due to the importance of the monetary constraint of the poorest population. The wealthiest population has a bigger maneuver concerning its monetary expenditure than the poorest one, who has a binding expenditure constraint.

Table 5 presents the results of the compensated price elasticity decomposed in monetary and time elasticities, for Ecuador and Guatemala respectively. It is interesting to see how the Ecuadorian results present a clear pattern where the monetary elasticities represent in average one third of the full elasticities for all commodity groups. This is due

to the relative stability of the monetary over the time component of the full expenditures in Ecuador. This pattern is not found in the Guatemalan case where the proportion of monetary and time elasticities change from one good to another. However, due to the definition of full price elasticities, one can remark that monetary elasticities of money intensive goods are bigger compared to time and vice versa. Common characteristics are found in transport, personal care, education, and leisure, where the values of the monetary elasticity are smaller than those of time elasticity for both countries.

Table 5: Decomposition of Compensated Own-Price Elasticities

Commodity Groups	Decomposition					
	Ecuador			Guatemala		
	Full	**Monetary**	**Time**	**Full**	**Monetary**	**Time**
Food	-0.766	-0.341	-0.426	-0.739	-0.569	-0.171
Housing	-1.116	-0.333	-0.783	-0.813	-0.608	-0.205
Transport	-1.088	-0.336	-0.752	-1.198	-0.461	-0.737
Clothing	-1.021	-0.242	-0.779	-0.837	-0.495	-0.342
Personal Care	-1.004	-0.130	-0.874	-1.034	-0.426	-0.608
Health	-1.343	-0.529	-0.814	-1.462	-1.338	-0.124
Education	-1.139	-0.186	-0.953	-0.657	-0.197	-0.460
Leisure	-0.798	-0.068	-0.730	-0.714	-0.340	-0.374
Others	-1.254	-0.536	-0.718	-	-	-

Tables A.7 and A.8 in the Appendix present the same results by educational attainment. The results from Guatemala show an interesting pattern: from primary to tertiary education, the monetary price elasticities are increasing in value for all goods but health, while the time elasticities are decreasing in value for all goods but leisure. Results from Ecuadorian sample concerning monetary price elasticities are quite similar. From primary to tertiary education, the elasticities are increasing in value for all goods but health and food. Once again, this is explained by the fact that richer households face less monetary constraints compared to the poorest ones. The pattern is less clear for time elasticities, where food and education show and increasing pattern and other goods like transport, health, and others show a decreasing one.

Conclusion

The effect of public policies on households consumption is primarily determined by the resulting changes in incomes and prices. One of the goals of this paper is to provide

consistent parameters estimates that can be used to calibrate macro and microeconomic simulations models, such as computable general equilibrium models. The method used in this article provide such estimates for different commodity groups in absence of real price data, solving in this way the problem of price data availability in most developing countries.

Since the analysis of welfare policies concerns different sub-groups of the population and income and price elasticities may change at different levels of income, we reestimate the model by educational attainment. Compensated full price elasticities range from -1.5 and 0 and are bigger in Ecuador than Guatemala. Indeed, the Ecuadorian demand is more elastic to changes in prices than the Guatemalan one, where just three commodities are price-elastic compared to seven for Ecuador. As pointed out in the decomposition results, monetary elasticities correspond, in average, to one third of the full price elasticities, which suggest that shocks in prices are mostly offset by time adjustments.

Regarding income elasticities, the demand for different goods is pretty elastic for Ecuador and inelastic for Guatemala. This can be explained by the share of time intensive versus monetary intensive goods and the monetary constraints that the population face in each country. Remember that domestic production allows for an exchange between time and monetary goods. That is, if the income of the family decreases the aggregated good *i* that has become in monetary terms less affordable, can still be consumed if it is compensated by an increase in time in the domestic production (i.e. consumption of meals at home increases while consumption away home decreases). This apply to the subpopulations where the monetary constraints make the substitution possible.

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AppendixA

Table A.1: Descriptive Statistics (Ecuador, Whole Sample)

	Socio-Economic Variables				
Variables	Obs	Mean	Std. Dev	Min	Max
Income per Capita	7482	2,962	2,315	182	25,134
Household Size	7482	3.34	1.70	1	13
Age Household Head	7482	42.47	16.08	12	98
Percentage Urban Households	7482	0.59	0.49	0	1
Ave. Number of Children	7482	1.59	1.51	0	11
Percentage Couples	7482	0.77	0.42	0	1
Primary Education	7482	0.53	0.50	0	1
Secondary Education	7482	0.31	0.46	0	1
Tertiary Education	7482	0.16	0.37	0	1

Ecuador data is shown in local currency, US dollars

Table A.2: Descriptive Statistics (Ecuador, Subsamples)

	Socio-Economic Variables									
Variables	Q1	Q2	Q3	Q4	-30	30-60	60+	Primary	Secondary	Tertiary
Income per capita	553	1,320	2,258	5,673	2,073	2,664	2,104	1,577	2,599	5,071
Household Size	3.55	3.65	3.25	2.92	3.31	3.73	1.84	3.34	3.44	3.17
Age Household Head	47.30	39.68	39.57	43.33	25.12	40.96	71.94	46.73	36.65	39.46
Percentage Urban Households	0.32	0.53	0.67	0.84	0.58	0.61	0.49	0.41	0.74	0.89
Ave. Number of children	1.87	1.87	1.47	1.17	1.50	1.96	0.28	1.61	1.67	1.40
Percentage Couples	0.70	0.79	0.79	0.78	0.82	0.80	0.56	0.75	0.79	0.78
Primary Education	0.79	0.64	0.47	0.23	0.46	0.48	0.85	1	0	0
Secondary Education	0.19	0.30	0.40	0.34	0.41	0.32	0.10	0	1	0
Tertiary Education	0.02	0.06	0.13	0.43	0.13	0.20	0.05	0	0	1
Observations	1,871	1,889	1,852	1,870	1,607	4,688	1,187	3,988	2,302	1,192

Ecuador data is shown in local currency, US dollars
Data shown in mean values for income quantiles, three age groups, and three eduction leves

Table A.3: Descriptive Statistics (Guatemala, Whole Sample)

	Socio-Economic Variables				
Variables	Obs	Mean	Std. Dev	Min	Max
Income per Capita	3759	14,729	40,336	31	1,524,248
Household Size	3759	4.31	2.03	1	12
Age Household Head	3759	38.49	14.34	16	95
Percentage Urban Households	3759	0.45	0.50	0	1
Ave. Number of Children	3759	2.43	1.92	0	9
Percentage Couples	3759	0.82	0.39	0	1
Primary Education	3759	0.77	0.42	0	1
Secondary Education	3759	0.17	0.38	0	1
Tertiary Education	3759	0.06	0.24	0	1

Guatemala data is shown in local currency, Quetzales

Table A.4: Descriptive Statistics (Guatemala, Subsamples)

	Socio-Economic Variables									
Variables	Q1	Q2	Q3	Q4	-30	30-60	60+	Primary	Secondary	Tertiary
Income per Capita	2,720	5,902	10,583	39,739	12,568	15,807	14,789	9,640	23,234	56,278
Household Size	4.76	4.62	4.32	3.55	3.90	4.89	2.23	4.47	3.84	3.62
Age Household Head	38.63	38.17	38.09	39.05	25.11	39.62	70.18	39.47	34.35	37.74
Percentage Urban Households	0.24	0.34	0.46	0.73	0.40	0.46	0.45	0.34	0.77	0.90
Ave. Number of children	2.89	2.70	2.42	1.70	2.00	3.01	0.32	2.58	1.98	1.73
Percentage Couples	0.80	0.82	0.83	0.80	0.87	0.83	0.61	0.81	0.82	0.86
Primary Education	0.95	0.90	0.78	0.45	0.75	0.76	0.90	1	0	0
Secondary Education	0.04	0.09	0.20	0.35	0.22	0.17	0.08	0	1	0
Tertiary Education	0.01	0.01	0.02	0.20	0.04	0.08	0.02	0	0	1
Observations	940	940	940	939	1,127	2,237	395	2,889	649	221

Guatemala data is shown in local currency, Quetzales
Data shown in mean values for income quantiles, three age groups, and three eduction leves

Table A.5: Ecuador: Full Cross-Price Elasticities. Minimum Wage, Whole Sample

Cross-Price Elasticities									
Commodity Groups	Food	Housing	Transport	Clothing	Personal Care	Health	Education	Leisure	Others
Food	-0.766	0.492	0.419	0.418	0.404	0.643	0.461	0.373	0.525
Housing	0.151	-1.115	0.142	0.120	0.122	0.149	0.126	0.113	0.167
Transport	0.066	0.073	-1.088	0.065	0.064	0.065	0.014	0.060	0.080
Clothing	0.062	0.058	0.061	-1.021	0.058	0.058	0.063	0.054	0.057
Personal Care	0.076	0.075	0.077	0.074	-1.004	0.075	0.080	0.069	0.073
Health	0.065	0.049	0.042	0.039	0.040	-1.343	0.063	0.040	0.061
Education	0.060	0.054	0.012	0.055	0.040	0.081	-1.140	0.065	0.021
Leisure	0.233	0.230	0.240	1.055	0.055	0.247	0.313	-0.796	0.235
Others	0.060	0.062	0.058	2.055	0.229	0.068	0.019	0.043	-1.248

All respective elasticities are calculated using the sample means of the data

Price elasticities are estimated under symmetry and homogeneity constraints

Table A.6: Guatemala: Full Cross-Price Elasticities. Minimum Wage, Whole Sample

Cross-Price Elasticities								
Commodity Groups	Food	Housing	Transport	Clothing	Personal Care	Health	Education	Leisure
Food	-0.739	0.463	0.552	0.389	0.362	0.667	0.340	0.313
Housing	0.285	-0.813	0.245	0.212	0.210	0.225	0.201	0.195
Transport	0.081	0.058	-1.198	0.050	0.031	0.107	0.008	0.047
Clothing	0.060	0.053	0.052	-0.837	0.011	0.015	0.041	0.016
Personal Care	0.048	0.045	0.028	0.009	-1.034	0.122	0.014	0.016
Health	0.029	0.016	0.031	0.004	0.040	-1.462	0.021	0.008
Education	0.077	0.074	0.012	0.060	0.024	0.113	-0.657	0.040
Leisure	0.055	0.056	0.056	0.018	0.022	0.033	0.031	-0.714

All respective elasticities are calculated using the sample means of the data

Price elasticities are estimated under symmetry and homogeneity constraints

Table A.7: Compensated Own-Price Elasticities by Education Level

Commodity Groups	Ecuador					
	Monetary			Time		
	Primary	**Secondary**	**Tertiary**	**Primary**	**Secondary**	**Tertiary**
Food	-0.379	-0.332	-0.246	-0.415	-0.430	-0.456
Housing	-0.322	-0.345	-0.398	-0.788	-0.787	-0.870
Transport	-0.315	-0.337	-0.410	-0.778	-0.738	-0.701
Clothing	-0.231	-0.244	-0.276	-0.800	-0.756	-0.756
Personal Care	-0.126	-0.139	-0.129	-0.879	-0.870	-0.865
Health	-0.548	-0.503	-0.493	-0.870	-0.766	-0.694
Education	-0.151	-0.195	-0.298	-0.909	-0.972	-1.031
Leisure	-0.063	-0.072	-0.075	-0.734	-0.727	-0.724
Others	-0.384	-0.671	-0.952	-0.870	-0.629	-0.486

Table A.8: Compensated Own-Price Elasticities by Education Level

Commodity Groups	Guatemala					
	Monetary			Time		
	Primary	**Secondary**	**Tertiary**	**Primary**	**Secondary**	**Tertiary**
Food	-0.501	-0.714	-0.959	-0.172	-0.135	-0.124
Housing	-0.536	-0.675	-0.835	-0.205	-0.158	-0.123
Transport	-0.355	-0.683	-1.020	-0.784	-0.513	-0.330
Clothing	-0.431	-0.621	-0.786	-0.349	-0.290	-0.165
Personal care	-0.336	-0.640	-1.049	-0.616	-0.478	-0.447
Health	-1.291	-1.450	-1.061	-0.134	-0.092	-0.054
Education	-0.172	-0.232	-0.402	-0.449	-0.482	-0.415
Leisure	-0.311	-0.361	-0.518	-0.341	-0.439	-0.459